

WHAT IS CLAIMED IS:

1. A projection type display apparatus including a projection optical system for projecting image light from a display device, the
5 projection optical system having light amount adjusting means capable of substantially uniformly attenuating said image light in the cross-section thereof.

10 2. An apparatus according to Claim 1, wherein said light amount adjusting means has a variable stop comprising a plurality of tiltable light intercepting plates arranged in said cross-section.

15 3. An apparatus according to Claim 1, wherein said light amount adjusting means has a variable stop comprising a plurality of displaceable light intercepting plates arranged in
20 said cross-section.

4. An apparatus according to Claim 1, wherein said light amount adjusting means has ND filter means variable in transmittance.

25 5. An apparatus according to Claim 1, wherein said light amount adjusting means has a

stop variable in aperture diameter.

6. An apparatus according to Claim 1,
wherein a write signal to said display device is
5 modulated in synchronism with the adjustment of
the amount of light by said light amount adjusting
means so that the dynamic range about luminance
may change.

10 7. An apparatus according to Claim 1,
wherein said display device includes a light
modulating element and illuminating means for
illuminating said light modulating element with
light from a light source, and said illuminating
15 means has a first optical system for forming a
plurality of light source images by the light from
said light source, and a second optical system for
superimposing the beams from said plurality of
light source images on said light modulating
20 element, and said light amount adjusting means is
disposed at a position whereat said plurality of
light source images are projected.

8. A projection type display apparatus
25 comprising:

a projection optical system for projecting
image light from a display device;

light amount adjusting means for adjusting
the amount of said image light; and

control means for attenuating the amount of
light of the whole of said image light by said
5 light amount adjusting means and modulating a
write signal to said display apparatus so that the
dynamic range about luminance may be expanded.

9. An apparatus according to Claim 8,
10 wherein said light amount adjusting means
substantially uniformly attenuates said image
light in the cross-section thereof.

10. An apparatus according to Claim 9,
15 wherein said light amount adjusting means has a
variable stop comprising a plurality of tiltable
light intercepting plates arranged in said cross-
section.

20 11. An apparatus according to Claim 9,
wherein said light amount adjusting means has a
variable stop comprising a plurality of
displaceable light intercepting plates arranged in
said cross-section.

25

12. An apparatus according to Claim 9,
wherein said light amount adjusting means has ND

filter means variable in transmittance.

13. An apparatus according to Claim 8,
wherein said light amount adjusting means has a
5 stop variable in aperture diameter.

14. An apparatus according to Claim 8,
wherein said projection optical system has said
light amount adjusting means.
10

15. An apparatus according to Claim 8,
wherein said display device includes a light
modulating element driven in conformity with an
image signal, and illuminating means for
15 illuminating said light modulating element with
light from a light source, and said illuminating
means has a first optical system for forming a
plurality of light source images by the light from
said light source, and a second optical system for
20 superimposing beams from said plurality of light
source images on said light modulating element,
and said light amount adjusting means is disposed
at a position whereat said plurality of light
source images are projected.

25

16. An apparatus according to Claim 15,
wherein said illuminating means has said light

amount adjusting means.

17. An apparatus according to Claim 15,
wherein said projection optical system has said
5 light amount adjusting means.

18. A projection type display apparatus
comprising:

a light modulating element for controlling
10 the transmitted or reflected state of light to
thereby display a gradation image;

an illuminating device for applying light to
said light modulating element;

a projection optical system for projecting
15 the transmitted light or reflected light of the
light applied to said light modulating element;

write signal processing means for modulation-
processing a write signal to said light modulating
element;

20 projection light amount control means for
controlling the amount of light in the optical
path between the optical type integrator of said
illuminating apparatus to said projection optical
system; and

25 control signal generating means for
controlling said write signal processing means and
said projection light amount control means;

wherein said control signal generating means generates a control signal on the basis of the luminance level of an input image signal so as to make the amount of projection light great and the modulation of the write signal small when said
5 luminance level is high, and to make the amount of projection light small and the modulation of the write signal great when said luminance level is low.

10

19. An apparatus according to Claim 18, wherein said projection light amount control means adjusts the amount of light in the optical path between said illuminating device to said light
15 modulating element and/or between said light modulating element to said projection optical system.

20. An apparatus according to Claim 18,
20 wherein said projection light amount control means uniformly intercepts a light source image formed by said optical type integrator.

21. An apparatus according to Claim 18,
25 wherein said projection optical system is a so-called schlieren optics.

22. An apparatus according to Claim 18,
wherein said projection light amount control means
has movable stop means and stop driving means.

5 23. An apparatus according to Claim 18,
wherein said projection light amount control means
is disposed at a position which is not in
conjugate relationship with said light modulating
element.

10 24. An apparatus according to Claim 18,
wherein said projection light amount control means
controls the amount of stop in conformity with the
luminance level of the input image signal.

15 25. An apparatus according to Claim 18,
wherein the movable stop means of said projection
light amount control means is a stripe stop, and
the driving means is a cam motor or an ultrasonic
20 motor.

26. An apparatus according to Claim 18,
wherein said control signal generating means has
luminance level calculation means for calculating
25 the luminance level of the input image signal, and
projection light amount calculation means for
calculating the amount of projection light

emerging from the projection optical system in
conformity with said calculated luminance level,
and generates the control signal of said
projection light amount control means on the basis
5 of the amount of projection light calculated in
said projection light amount calculation means,
and generates the control signal of said write
signal processing means on the basis of the
luminance level calculated in said luminance level
10 calculation means and said calculated amount of
projection light.

27. An apparatus according to Claim 18,
wherein said luminance level calculation means
15 calculates the maximum value of the luminance
signal of each pixel in each field or each frame
of an image signal as maximum luminance.

28. An apparatus according to Claim 18,
20 wherein said luminance level calculation means
calculates the cumulative histogram of the
luminance signal of each pixel in each field or
each frame of an image signal, and calculates a
luminance level at which said cumulative histogram
25 becomes constant or greater as maximum luminance.

29. An apparatus according to Claim 18,

wherein said write signal processing means modulates the write signal so as to amplify it at an amplification factor substantially inversely proportional to said amount of projection light.

5

30. An apparatus according to Claim 18, wherein said light amount control means is disposed at the pupil position of said projection optical system.

10

31. A projection type display apparatus comprising:

a projection optical system for projecting an image onto a screen; and

15

light amount control means for uniformly intercepting a light source image projected onto the pupil of said projection optical system.

32. A projection optical system for projecting image light, said projection optical system having light amount adjusting means capable of substantially uniformly attenuating said image light in the cross-section thereof.

25 33. A system according to Claim 32, wherein said light amount adjusting means has a variable stop comprising a plurality of tiltable light

20250703-110600

34. A system according to Claim 32, wherein
said light amount adjusting means has a variable
5 stop comprising a plurality of displaceable light
intercepting plates arranged in said cross-section.

36. A system according to Claim 32, wherein said light amount adjusting means has a stop variable in aperture diameter.

15